SECTION 22: CONCRETE CURB, GUTTER, SIDEWALK, DRIVEWAY, VALLEY GUTTER AND ISLAND CAP

22-01 SCOPE. Portland cement concrete curb, gutter, sidewalk, driveways, valley gutters and island caps shall be constructed as shown on the Standard Details at the locations and to the dimensions shown on the Plans and specified herein.

22-02 MATERIALS.

22-02.01 Concrete shall conform to Section 90, "Portland Cement Concrete," of the Standard Specifications except as modified herein.

The classes of concrete and the combined aggregate grading shall be dependent upon the purpose for which the concrete is intended and shall conform to the table below:

Types of Concrete <u>Work</u>	Concrete Class	Combined Aggregate <u>Grading</u>	Min. Cem (Sks/cy)	Max. w/c Ratio (Gal/Sack)	Max. Slump (Inches)	Min. Str. Test Cyl. 28 Days (PSI)
Curb, Gutter, Sidewalks, Driveways and Island Caps	В	1-1/2" Max.	5	7.0	3	2,500
Valley Gutters	A	1-1/2" Max.	6	6.0	3	3,300

22-02.02 Adhesives. Adhesives shall conform to Section 95, "Epoxy," of the Standard Specifications.

22-02.03 <u>Lampblack</u>. Lampblack shall be of approved quality mixed at the rate of one-half (1/2) pound per cubic yard of concrete. In the case of island curb, gutter and cap, the lampblack shall be omitted.

22-02.04 Joint Filler. Premolded joint fillers shall conform to specifications of ASTM Designation D1751, and shall be at least three-eighths of an inch (3/8") wide.

22-02.05 Dowels. Steel dowels shall conform to ASTM Designation A615.

- **22-02.06 Bar Reinforcement.** Bar reinforcement shall conform to Section 52, "Reinforcement," of the Standard Specifications.
- 22-02.07 <u>Curing Compound</u>. Curing compound shall conform to the specifications of AASHTO Designation M148, Type II, clear, and shall consist of a practically colorless impervious liquid which will thoroughly seal the surface of the concrete and will not impart a slippery surface thereto. The quality and the quantity to be used shall be approved by the Engineer. The use of any membraned material which would impart a slippery surface to the concrete or alter its natural color will not be permitted. The colorless, impervious liquid shall contain not less than twenty-five percent (25%) solids.
- **22-03 SUBGRADE PREPARATION.** The subgrade shall be constructed true to grade and cross-sectioned, as shown on the Plans. The required thickness of aggregate subbase shall be placed in accordance with the Standard Details, and compacted to ninety-five percent (95%) relative compaction under the curb, gutter and driveway areas and ninety percent (90%) relative compaction under the sidewalk area as tested in conformance with Test Method No. California 216.
- **22-04 EXISTING CONSTRUCTION.** Where the Plans provide for the reconstruction of a portion of an existing curb, gutter, sidewalk or driveway, the existing section shall be cut to a minimum depth of one and one-half inches (1-1/2") with an abrasive-type saw at the first scoring line at or beyond the planned joint and the entire section to be reconstructed shall be removed. The new work shall adjoin the old work at this line. If the old work is damaged beyond this line in removing the old concrete, a new line shall be cut at the next score line beyond the line of damage and the damaged concrete shall be removed and replaced at no additional cost. Where new concrete work conforms to existing concrete work, steel dowels consisting of No. 4 reinforcement bars shall be placed in existing curb, sidewalk and driveway sections in accordance with Paragraph 22-09.03, "Sidewalks, Driveways, Island Caps and Valley Gutters" of these Standard Provisions.
- **22-05 FORMS.** Forms shall be true and shall have a smooth, straight upper edge. Metal forms may be used upon approval by the Engineer.

Timber forms shall be surfaced on the side placed next to the concrete and shall not be less than one and one-half inches (1-1/2") thick after being surfaced except on curb returns, horizontal curves and vertical curves where laminated timber forms, benders or thin plank forms may be used.

The form boards of the exposed face of curb shall be milled to the proper radius at the lower inside corner.

Front face forms shall not be removed in less than two (2) hours after the concrete has been placed. In no event shall forms be removed while the concrete is

sufficiently plastic to slump. Side forms for sidewalks, island caps, valley gutters and driveways shall not be removed in less than thirty-six (36) hours after the concrete has been placed.

22-06 <u>PLACING CONCRETE</u>. No concrete shall be placed until the forms have been checked by the Engineer and unless the Engineer is present. No concrete shall be placed when the air temperature is below forty degrees Fahrenheit (40°F) or during rain. During weather when frosts may be expected, the Contractor shall carefully cover recently deposited concrete with burlap, straw or provide for other approved curing method. No concrete shall be placed within three (3) hours of sunset. Before placing concrete, the aggregate base or subbase shall be properly moistened with water, and the form faces shall be oiled.

Concrete shall be placed and compacted in forms without segregation. After placing, the concrete shall be consolidated sufficiently to produce a dense mass, struck off and floated. Final finishing operations shall not proceed until all bleed water has evaporated from the surface. Sprinkling of dry cement to absorb excessive surface moisture shall not be allowed.

The area around utility poles, electroliers, wooden street sign posts, drop inlets and hydrants shall be blocked out during the initial placing of concrete.

22-07 EXPANSION JOINTS, CONTROL JOINTS AND SCORE MARKS. Expansion joints shall be placed in the concrete curbs, gutters, sidewalks at not more than fifty foot (50') intervals and at each side of the driveways and in all returns. Expansion joints shall be placed at right angles to the curb or sidewalk line and extend through the entire thickness of the concrete. Where sidewalk is constructed against concrete curbs, the joints shall be in line with the joints through the curb. Concrete adjacent to expansion joints shall be finished with an edger tool.

Expansion joints shall be placed around utility poles, drop inlets and hydrants so that no concrete is in contact with the appurtenance.

Where existing sidewalks and/or curb and gutter are to be removed and replaced with a driveway, no expansion joints will be required at the cold joints.

Where electroliers are located back of sidewalk, expansion joint material shall be placed at the back of walk between the sidewalk and the electrolier base.

Bases for electroliers within the sidewalk shall be completely separated from the sidewalk by felt roofing paper.

Locations for wooden street sign posts, including street name signs which are to be installed in concrete sidewalk or island cap areas, shall be blocked out in accordance with the Standard Details.

Control joints, scored at least one-fifth (1/5) the depth of concrete being placed shall be constructed at intervals not to exceed ten feet (10') in concrete curbs, gutters, sidewalks, centerline of driveways and island caps. The width of the control joints shall not exceed one-fourth inch (1/4") and the edges of control joints shall be finished with a "T" bar. All joints shall be scored at right angles to the curb or sidewalk line.

The sidewalk between control joints shall be divided by transverse score marks placed at nominal thirty-inch (30") intervals and longitudinal score marks placed at uniform intervals not to exceed thirty-six inches (36"), unless otherwise shown on the Plans or directed by the Engineer. All score marks shall be straight, uniformly spaced, one-fourth inch (1/4") in depth and left in a cleanly rounded condition.

Maximum delay between successive pours shall not exceed the time of initial set unless a construction joint is installed.

22-08 CURING. As soon as the concrete is set, it shall be cured for a period of at least seventy-two (72) hours by applying a suitable cover that will keep all exposed surfaces continually damp or by spraying with an approved impervious membrane curing compound.

The Contractor shall protect from damage, including graffiti marks, all completed Work. Special emphasis shall be placed on protecting the edge of gutter from being damaged or gouged during grading operations. The Contractor shall keep all equipment off new or existing sidewalks. Repairs shall be made by removing and replacing the entire unit between score lines or joints. All discolored concrete shall be cleaned to a uniform color. Repairs and cleaning of new concrete shall be at the expense of the Contractor.

22-09 <u>CONSTRUCTION</u>. Where new curb and new gutter are shown on the Plans adjacent to new sidewalk, the curb, gutter and sidewalk (monolithic pour) shall be constructed together as a unit.

22-09.01 <u>Curb and Gutter (Also Curb Only)</u>. Where new curb and new gutter are shown on the Plans, they shall be constructed together as a unit.

Immediately after removing the front curb forms, the face of the curb shall be troweled smooth and then finished with a steel trowel until a dense, hard, smooth surface has been obtained.

The top surfaces of the curb and gutter shall be finished with a steel trowel to a dense, hard, smooth surface and a straight edge ten feet (10') long is laid on the top or face of the curb or on the surface of gutters; the surface shall not vary more than 0.01 foot from the edge of the straight edge except at grade changes or

curves. After the top surface of the curb has been finished to a dense, hard, smooth surface, it shall be given a final brushed finish using a fine, dry brush with brush strokes parallel to the line of the curb.

Where the grade is one-half percent (1/2%) or flatter, a water flow test will be required to detect depressions in the gutter.

Concrete curbs to be constructed directly over an existing pavement shall be anchored to the pavement by three quarters of an inch (3/4") (minimum) round steel dowels ten inches (10") long on four-foot (4') centers set in cement grout in the existing pavement prior to constructing the curb.

Where new curb and gutter is installed adjacent to existing pavement, the existing pavement within twelve inches (12") of the edge of gutter shall be neatly sawcut, removed and replaced with new pavement. The new pavement shall be installed after the curb and gutter has been constructed and shall have the same structural sections and layer thickness as the existing pavement. However, deep lift asphalt concrete may be used provided that the deep lift asphalt concrete pavement has the same gravel equivalent as the existing pavement.

"S" and "W" shall be stamped in the face of curb where sewer laterals and water services pass under the curb.

22-09.02 Extruded Curb. Extruded curb construction shall conform to Section 73-1.05B, "Extruded or Slip-Formed Curb Construction," of the Standard Specifications and Paragraph 22-09.01 above. Extruded curb will only be allowed when specified. The extrusion of monolithic curb, gutter and sidewalk shall not be permitted.

The combined concrete aggregate shall be three-eighths inch (3/8") maximum grading.

22-09.03 Sidewalks, Driveways, Island Caps and Valley Gutters. Sidewalks, driveways, island caps and valley gutters shall be formed in place. The fresh concrete shall be struck off and compacted until a layer of mortar has been brought to the surface. The surface shall be finished to grade and cross-section with a wood or aluminum float, troweled to a dense, hard, smooth finish with a steel trowel, and finished with a fine, wet and soft brush with brush strokes transverse to the line of traffic.

The finished surface shall not vary more than 0.01 foot from a ten-foot (10') straight edge, except at grade changes, and the finished surface shall be free from blemishes.

When existing sidewalk is to be removed and replaced, the new concrete is to be tied to the remaining concrete curb, sidewalk and driveway sections

with dowels. The dowels shall be No. 4's with a minimum length of nine inches (9") and shall be installed at eighteen inches (18") on center along the back of the remaining walk and/or three feet (3') on center on the back of the remaining curb. The dowels are to be inserted to a minimum penetration of four inches (4") into the remaining sidewalk and/or curb and shall fit tightly into the existing concrete.

Three No. 4 steel reinforcing bars shall be placed as longitudinal reinforcement in all valley gutters.

- **22-10** <u>MEASUREMENT</u>. For the purpose of determining final pay quantities, sidewalks, driveways, island caps and valley gutters will be calculated to the nearest square foot, and curb and gutter to the nearest linear foot.
- 22-11 <u>PAYMENT</u>. The price paid per linear foot of each type of concrete curb and gutter and per square foot of sidewalk, driveway, island cap and valley gutter shall include full compensation for furnishing all labor, materials, water, tools and equipment; doing all the work including excavation, filling, forming and scoring; furnishing and placing expansion joint filler, aggregate subbase, concrete steel dowels where required, and adhesives; and doing all the necessary Work of constructing the various items of Work complete in place as required in the Special Provisions, shown on the Plans and specified herein.